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Patoka Valley PLTW Regional Partnership

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Pike Central HS PLTW *Petersburg, IN*

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Newsletter Info

*Follow the Hybrid HMMWV project
at <http://humveeproject.blogspot.com/>*

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This issue I am implementing a new newsletter format to allow for slightly larger pictures inserted into the text columns.

Pike Central Robotics Camp December 28 and 29 2009.

This will be two, 1-day camps focused on introductory C programming with RobotC from Carnegie Mellon University with the LEGO MINDSTORMS - NXT robotics kit

along with the Tetrix add-on. Held at Pike Central High School. <http://www.robotc.net>

PC Perspective: IVY Tech Robotics Contest – The Wall.

By: Brandon Bohnert



The 2nd place team from Pike Central getting pictures.

From left to right is: Anna Woolery, Brandon Bohnert, Emily Burns, and C.M. Brown.

On Saturday November 7, 2009, twelve students divided into three teams attended a robotics competition at Ivy Tech Community College in Evansville, IN. The competition was called “The Wall.” Each team designed a robot using a Lego NXT robotics kit. The robot consisted of motors, a computer, wheels, and various Lego parts. Once the robot design is

complete, we program the computer on the robot using a specific program designed for the robot. Using the program, you can make the robot follow lines, detect obstacles, make noises, talk, and perform movements.

The program that we used for the robot is called Program C. This program allows you to write your own program to put into the robot's computer.

For example, the following code will make the robot follow a black line for seventeen seconds:

```
Task main()
{
    ClearTimer(T1);
    while(time1[T1] < 17000)
    {
        if(SensorRaw[light] > threshold)
        {
            motor[motorC] = 0;
            motor[motorB] = 43;
        }
        else
        {
            motor[motorC] = 43;
            motor[motorB] = 0;
        }
    }
    {
        motor[motorC] = 0;
        motor[motorB] = 25;
        wait1Msec(800);
    }
}
```

When we got to the competition, they had two tables with identical courses set up for the robot. The robot had to make it through four doorways, knock two flags down, knock a cubic block off of a ledge, and make a line change. Each obstacle was worth a certain amount of points.

The robot had to follow the line to the first door, which was worth two points, and then use a mechanism designed by each team to knock the flags down. Each flag was worth six points.

Second, there was a ramp/bridge that went through another opening that the robot could travel over if the team chose. The bridge was worth four points.

Third, the robot can follow a line through the third doorway, which was worth two points, and knock the cube off a ledge cut out of the wall. The cube was worth four points.

After the third door, the robot follows a line that runs into a wall. Using a touch sensor, the robot hits the wall, backs up, turns to the right, and reacquires the line. Doing this is worth eight points.

We programmed our robots to do a one hundred and eighty degree turn and go back through the fourth door and reacquire the other line again scoring us more points.

We were very happy with our outcome in the competition. We had one team come in second place out of over twenty schools. We scored an overall of fifty two points and were very close to the winning team.

Our second place team, "The Mighty Mushrooms", consisted of C.M. Brown, Brandon Bohnert, Emily Burns, and Anna Woolery.

The second team, "The Richard Newkirk Robotic Experience", consisted of Richard Newkirk, BreAnn Lane, Caleb Daniel, and

Ethen Smith.

Our third team, “Teenage Mutant Ninja Toaster Strudels”, was made up of Brendan Ridge, Willy Klueg, Taylor Gwaltney, and Anthony Faith. Also helping with the design and programming of the robot were Taylor Wininger and Jordon Overbey.



Setting their robot up to run is (Left to Right) Brendan Ridge, Willy Klueg, and Anthony Faith. The robots were tested quite frequently so that the robot could run with perfection. .

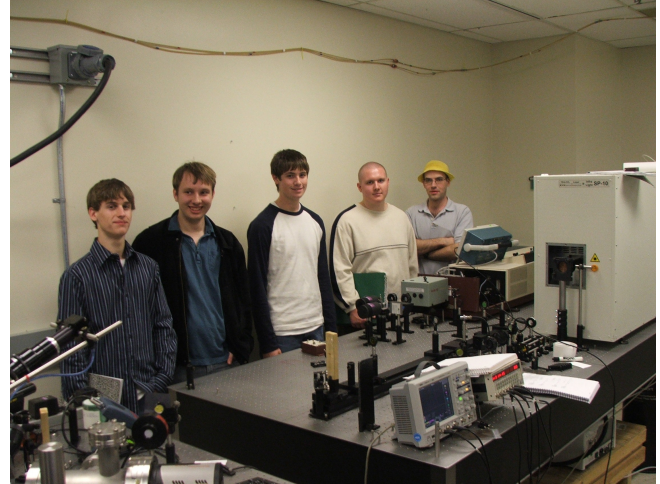


Explaining Pike Central High School’s newest robot, the Tetrix Robot, is Caleb Daniel and C.M. Brown. The Tetrix Robot is the newest version of the Lego robots. They feature more powerful motors and different materials to build the robot

out of.

PC Perspective: Purdue Road Trip.

By: Alex Morton



On November 13, Mr. Niehaus along with four PLTW student and their parents took a trip to the prestigious school of Purdue. The intention of the trip was to give the students a further look at what Purdue is really like, and what they might expect to be doing in the future. Excitement was obvious, and the three and a half hour drive probably seemed to be one of the longest that they had experienced.

As we started our approach to the city of West Lafayette we were greeted by large buildings that were not for business, but for the education of young men and women. Being from Pike County, all of the students were surprise and in awe as they looked upon the structures that seemed to go on beyond the horizon. They had seen pictures of the campus, but seeing it in real life was so much more intriguing. Needless to say the tour started on time.

The Nuclear Engineering Lab was our first destination, in which we were welcomed by two grad students that gave us an idea of what a Nuclear Engineer really does. One of them played on Purdue’s baseball team for a couple years, and then in his junior year decided that he

would like to go into Nuclear Engineering. The students were confused why he would choose his major at such a late time in college. He responded by saying that it is not a rare occasion for a student to choose a career interest in their sophomore or junior year, and that sometimes they may choose in their senior year.

We were then led into a room that took a password to enter, and was probably not seen by many people. It contained a machine that could compress an object and simulate some of the conditions of space. It was still under construction, but the surprising thing about it was that it was constructed by grad students and not by professors.

After lunch we were led to a large building and told it that housed some very interesting things. When we entered we read a sign that said Ultra Intense Lasers. You can imagine this immediately caught the attention of four teenage boys, and most likely the adults as well. We taken to a large room that had one of the walls covered in a plastic material, I assumed that behind the fake wall was some kind of laser set up, but I wasn't for sure. We were again greeted by two grad students that we performing an experiment on a infrared laser that could somehow send sound information to a receiver that would then decode it, and play it out a speaker. Although they did not tell us a whole lot of information about the laser it was certainly an extraordinary sight to see.

Next they pulled back the plastic wall and showed us a very large and eccentric laser setup. It showed that our holographic laser was simply child's play compared to this series of lasers. They were set up on a large table which had thousands of small mounts where you could mount lasers, mirrors, beams splitters, and so on. We asked them about some of the traits that the table had and they said that it was made of stacks of plywood and other seismic absorbing materials, because when shooting lasers you need not only a very sturdy base but also one that will not shake at any sudden movements. Just the slightest

movement or disturbance could result in the destruction of materials and time.

As we were leaving we met a laser technician that was walking down the hall, he asked us if we were a tour and then urged us to come and see another lab that was down the hall. It was called the Extreme Environmental Conditions lab, when we walked in it was a small room that had another false wall, eager to see what they had to show us we inched towards it. As the technician pulled back the plastic we saw another compression chamber, almost exactly like one in the nuclear lab that was under construction. Next to the chamber was another set up of lasers, oddly enough though there was a piece of wood in the middle of mass of mirrors and reflectors. It had a dark area on it that was indented; it looked as if someone had sat with a magnifying glass and burned a whole in the wood.

Unfortunately we had to continue moving on, so we then took a walk through the campus. It was such a large place, in between each set of buildings were places that resembled small city parks, where students could sit down and relax or do homework. We arrived to a building and went inside; we then walked down two flights of stairs and arrived at a door. I had no idea where we were but I had a feeling that it had to be good. We were greeted by a man who appeared to be very bright, we followed him in to a classroom like place and he had us sit down. We had to sign a paper saying that we were at the Nuclear Reactor on November 13. Yes, a nuclear reactor; Purdue has their own nuclear reactor. I was as surprised as some of you may be. The man then began to talk about how a nuclear reactor really works and what we might be able to see. We were then guided to a set of heavy duty doors and asked to not take any pictures. The reactor was not like I had imagined and was located at the bottom of a very large well like structure that was full of water. It was constructed in the 60's and I thought that the Cold War had a large influence on its existence, but we were told that its main

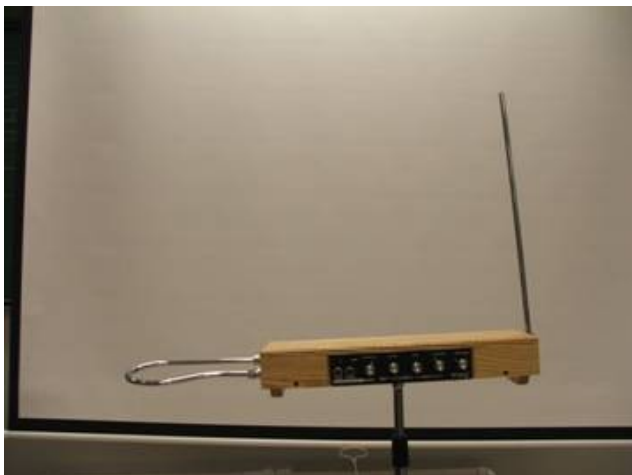
purposes was to provide a hands on place for education and job training.

Our last stop of the tour was across campus in a very high tech looking building. It was a place where some professors and even companies can come to perform work that can only be done in a controlled environment. They were called clean rooms. They had no traces of outside particles such as tree pollen. If you had asthma or allergies, you could go into these rooms and not experience any symptoms. It was a very interesting place to say the least, and was also the main building for nanotechnology at Purdue.

As our tour came to an end, we got loaded up onto our bus and said goodbye to Purdue University. The trip gave us a new look at college and provided us with some helpful information for the future, and for some of us it would be a place that we would continue our education.

PC Perspective: The Theremin Project.

By: Alex Benefiel and Willy Klueg



Theremin

When Willy and I started this project we didn't know each other very well. By working together on projects as it is for every student you learn how to adjust to partnership and how to work together. In the beginning it was difficult to find a balance

for both our disciplines. Once we got to know each other it became easier.

A Theremin is a musical instrument that basically is played without touching it. The Theremin is a wooden box with electronics inside with two antennas. It uses potentiometers to create sound, which is a measuring instrument for measuring direct current electromotive forces. The horizontal (or the side-to-side) antenna is a looping antenna. It controls the volume by moving the hand up and down. The closer it gets to the antenna the quieter, the further the louder. The vertical or up and down antenna controls the pitch. Now using the right hand the closer it gets the higher the pitch, and the further the lower. The Theremin uses Ether waves as well as RFID's. RFID stands for radio frequency, identification, device. Both RFID's and the Theremin were invented by Leon Theremin who was actually a Russian spy during the Cold War.

In Mr. Niehaus's class we have learned many things about these RFID's. We have actually constructed a binder full of information about how they work and where they are used. At first it was difficult for me to grasp the concept of RFID's because I had never been exposed to technology like this. With the work I was assigned it helped considerably, as well as my peers.

Mr. Niehaus's classes have inspired so many students to look further then their nose. They walk in thinking that they generally know what's out there. But it only takes a few short weeks before their eyes are opened. There are so many things a person can do from hydrogen fuel cells to robots, and everything that students could think of in between. Mr. Niehaus makes students open their eyes and think outside of the box. He forces them to see things differently so you can open your mind to what you can do, and everything that is possible. You don't have to be a genius you just have to have a want to do well in his class. Our school is very lucky to have these Project Lead the Way classes as well as Mr. Niehaus. I think

everyone should have this chance to excel. It's absolutely fascinating what we can do if given the opportunity. We don't plan to stop either. You can expect to see bigger and better things from this class.



Alex Benefiel and Willy Klueg playing the Theremin.